

E-COMMERCE: ONLINE BOOKING SYSTEM FOR AUTOMOBILE INDUSTRY

Abdul Hafeez Kusmani

Dissertation submitted in partial fulfillment of
the requirements for the
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CERTIFICATION OF APPROVAL

E-Commerce: Online Booking System for Automobile Industry

By

Abdul Hafeez Kusmani

A project dissertation submitted to the

Information System Programme

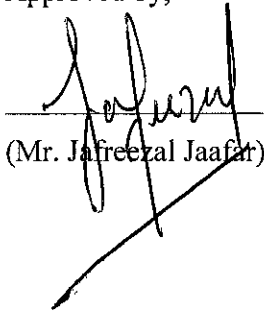
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Approved by,

A handwritten signature in black ink, appearing to read 'Jaafar', is written over a horizontal line. Below the line, the name '(Mr. Jafreezal Jaafar)' is printed. A long, diagonal stroke extends from the bottom of the signature area towards the bottom left of the page.

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

June 2004

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



ABDUL HAFEEZ KUSMANI

ABSTRACT

Nowadays, Internet has become an important element in our day to day life. The technology regarding Internet also has improved a lot since it is introduced a long time ago. It created a borderless world for people to communicate and seek for information and new knowledge. The project is about developing a web site for automobile company that provides product information that available for sale. The reason for this project is to encourage more Malaysians to use Internet as a medium for online shopping to increase the rate of Internet usage in Malaysia, and to provide an automobile service to people who interested to survey product information through online. The objective of this project is to develop a website for automobile industry. It is to promote and provide information to potential customers where it can be accessed at anytime and anywhere using web browser. Next, is to develop 3D car model using VRML in order to integrate with the company website. It is to enhance the level of understanding and realism of product being sold through Internet. The website is developed using System Development Life Cycle (SDLC) approach. It consists of four phases; analysis phase, design phase, development phase, and evaluation phase. The methodology is used to plan the development of the project. To evaluate the efficiency of the website in overcoming the problems, a test has been conducted. From the test, it seems that the participants are willing to try this kind of service and agree that automobile industry can gain benefits from the Internet. As to conclude, we must firstly understand the drivers of the technology innovation. Malaysia has a huge potential for Internet procurement and we shall not wasting the advantage that we have.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

The project is about developing an E-commerce website for the automotive industry. This project is to encourage the internet users to make full use of world without boundary technology. Potential customers who wanted to buy or book and even to test drive the car can interact with the car agent through a website. The car buyers may seek the information regarding the prices and the car specification. Buyers also can view the pictures of the car model available for book or test drive.

The project will allow the users to take an advantage of the web features to enable two way communications among two parties, which are the customers and the car agent. The Internet provides efficient marketing capabilities of the web, low transaction costs and also customer contact and support. The website will also provides graphics and virtual reality capabilities so that users will have better experience on finding the right car for them over the web.

Currently, there are some car agencies in Malaysia that implement E-commerce features into their website for their product. Mostly, they only put description of the specification and some pictures of the car. Because of this, the customers cannot have a look at the car model. The car agency website does not fully utilizing the graphic capabilities of the Internet in marketing their products. Here, the project is to develop an online car booking system with one unique feature that is virtual reality in the website. Not only have that, this website provide a way for customers to experience the product without actually going out. Besides it increase the level of understanding how the car looks like, it will also reduce a perceived error made by customer before they make a payment.

There are several features that distinguish E-commerce and the Internet from real automobile business operations. It provides a new form of communication between customers and sellers by making worldwide communication possible at any time at very low price and less time. The website will have an online car customization to allow the customer build their perfect car and provide their customer a view how their car looks like. By taking advantage of the power of customization of products and services through the Internet, customers are allowed to choose additional accessories they want while reducing the delivery times for custom product.

Another main concern for this project is on customer satisfaction on the product itself. This type of satisfaction has been used widely in advance country such as China and U.S. They add this element to increase the value of the product to make sure customer right is protected by the company. This project is aim to increase the level of perception of internet user using e-commerce technology. These website allow a buyer to book their favorite car for test drive before they make any payment to the car company.

Real automobile business may have the advantage of facilitating its role of a firm as customer as well as a producer of its services. Network linkages offer the possibility of new forms of inventory control and ultimately new approaches to production and service provision. The time used to run the process of buying a car such as surveying, testing or booking will be reduce as this new system reach their matured period. Not only that, it will deliver large market expand but very low marginal cost once the system is up and running.

1.2 Problem Statement

The world is greatly moving towards Electronic Business (E-Business) and Electronic Commerce (E-Commerce) activities. International Data Corporation (IDC) estimated that the number of Internet users in Asia Pacific (excluding Japan) would reach 240 million by 2005. IDC predicted that more than 72% of all Asia-Pacific users would be from China, Korea and India. Total e-commerce revenues in Asia Pacific region are expected to grow to US\$600 billion by 2005 [9]. Malaysia needs to take these trends and react fast in order to be an active participant in the emerging electronic world. However, little information is known about Malaysian Internet users' motivation and concern factors with respect to online shopping. A lot of research carried out in order to get viable solutions to the above problems, particularly in respect of Malaysia.

The number of Malaysian Internet users is expected to increase to more than 3 million in 2001 and 6 million by 2005. In 2000, there were about 2 million Internet users in Malaysia. 68% of Malaysia's online population is male and 84.7% of users are between the ages of 19 and 34. Malaysian B2B revenues are expected to reach RM14.8 billion in 2005, from RM44.5 million in 2000. According to IDC, total Malaysian e-commerce revenue was RM1.5 billion in year 2000, making up 16% of total Asian e-commerce revenues of US\$2.4 billion (MYR9.1 billion) [9]. This is a good view where each year the percentage of Malaysian people shopping through online is increase. The growth of Information Technology (IT) and Government initiatives are expected to accelerate further and motivate individuals to increase their knowledge on Electronic Commerce in the near future. Government also needs to introduce a lot of program and promotion to make Malaysian people use as much as possible this new technology. The project also wants to promote more Malaysian people who are willing to buy a new car to start their survey through online.

To most consumers, the issue of security and privacy over the Internet is the biggest barrier facing the adoption of Electronic Commerce that caused them not to make any purchase on the Internet. A lot of cases occurred regarding cyber crime that makes most of the internet user have little confident in using Internet as a medium for commerce. They didn't expose or introduced to the latest security technology and cyber law that can protect their personal information for being exposed to other

parties. The project is method to promote the full usage of the E-commerce and perhaps will bring the new environment of shopping in Malaysia.

Electronic Commerce also enhances flexibility and convenience. Consumers can enjoy window-shopping on the Internet without the pressure to purchase, unlike the traditional shopping environment. Consumers are able to initiate and control non-linear searches, due to the interactive nature of the Internet and the hypertext environment. Easy access to an abundance of current and detailed information on products and services facilitates comparison shopping and enables consumers to make more informed decisions. There is also no driving or parking costs associated with shopping online. Almost all products will be delivered to the consumers, either immediately via electronic medium or by the wide distribution network of the Internet vendors. However, government or private parties that have an authority need to grant the consumer on the product being delivered is good as offered. This is because consumer didn't have an opportunity to view certain product in real before make any payment. The project will have a feature where customer who wants to buy a car can book for test drive the car model that they desired.

1.3 Objectives and Scope of Study

1.3.1 Objectives

The main objective of this project is to develop a website for automobile industry. It is to promote and provide information to potential customers where it can be accessed at anytime and anywhere using web browser. Next, is to develop 3D car model using VRML in order to integrate with the company website. It is to enhance the level of understanding and realism of product being sold through Internet.

1.3.2 Scope of Study

The study will only be within several car dealers around Ipoh, Perak to gather all information needed or knowing the process of buying a car. Through this websites, users can search all information regarding their dreamed car to make a choice. Common examples of characteristics or specification that buyers need to know are price range, loan types, security features, or any additional features.

The project also will study the possibility of using an online technology. This system will provide customers with online car booking for buying or test drive. Beside it help Car Company entertain their customers; it also can assist their customers managing their schedule to go to the car showroom.

Another scope is to study the possibility to put virtual reality element in the website for browsing a product through online. Here the users have a real experience on how the car looks like before they book or agree to buy that car. The car model can be browse in 3D so that the user can navigate to each part of the car to know the detail. Customers can have an idea on what features are offered in that car model using that 3D car model

CHAPTER 2

LITERATURE REVIEW

2.1 What is E-commerce?

According to Malaysia External Trade Development Corporation (MATRADE), E-commerce means electronic commerce i.e., any business that is transacted electronically, or over the Internet [1]. To conduct business on the Internet you need an e-commerce web site. Your e-commerce web site can be as simple as a catalogue with an order form, or it can be a complex multimedia enabled web site with real-time payment processing capabilities. E-commerce offers customers the opportunity to browse, select and pay for goods in real time from the comfort of their own home or office. Any business whether small or big can actually gain the benefits of e-commerce.

There are two types of e-commerce, B2B and B2C [1]. B2B is business to business e-commerce. It simply means businesses selling to other businesses. Examples of B2B are factories selling to wholesalers; wholesalers selling to retailers; office suppliers selling to offices; farmers selling to markets; etc. Any deal between two business entities is B2B e-commerce. B2C e-commerce means business to consumer e-commerce. Unlike B2B, B2C means businesses selling to consumers, usually in the form of online shops. Example of a B2C website is the Royal Selangor Online Shop.

Electronic Commerce also enhances flexibility and convenience. Consumers can enjoy window-shopping on the Internet without the pressure to purchase, unlike the traditional shopping environment. Easy access to the detailed information on products and services facilitates consumers to make more accurate decisions. There is also no driving or parking costs associated with shopping online. Almost all products will be delivered to the consumers, either instantaneously via electronic medium or by the wide distribution network of the Internet vendors [8].

2.2 E-commerce in Malaysia

E-commerce came into Malaysia when the Internet boom and people seem that Internet is a new medium to conduct a business over the past 11 years due to the increasing popularity of the Internet. Internet brought a new horizon to the way people conduct their business nowadays. This is because internet introduces interactive communication for everyone by allowing the users to choose their needs without any pressure. Now, communication providers such as JARING and TMNet must now satisfy the requirements of the market and vice versa.

From the research findings conducted by IDC (International Data Corporation) [3] looks that Malaysia have a positive looks in B2B e-commerce market. IDC also has released its forecast for the Malaysia B2B e-commerce market, expecting a figure of US\$7.8 billion in 2005. In the B2C arena, IDC expects the Malaysian market to reach US\$1.5 billion in revenues by 2005. One-third of all local Internet users have made online purchases over the past 12 months and by 2002, 50 percent of all local Internet users will have conducted Internet transactions.

E-commerce and e-business is important to Malaysia because the growth in e-commerce will lead to an overall increase in Malaysia's trade with the world. E-commerce recognizes no borders and the distinction between a country's international and domestic policies are increasingly blurred. E-commerce is open and available to everyone big and small, poor and rich – but it does not necessarily mean that it is accessible to every one especially those from poorer countries.

Therefore, developed and wired economies (information economies) such as the US, Canada and Japan have the highest possibility of realizing huge profit margins when trading with other economies. They will benefit the most, compared to an agricultural-based or an industrial economy because trading partners such as the agricultural-based or the industrial economy becomes captive markets of information economies. Conducting business globally today is a necessity and economies must be able to trade at par.

The impact of e-commerce on corporations and society is huge because it could result in new or redefined markets. Society will benefit from the increased scope and

ease of access to information, products and services, and the means of acquiring them. Time and geographical limitations are no longer barriers for communication or trading and society will have remarkable choices over commodities. Early adopters of e-commerce will see it as an opportunity; for latecomers, it is a threat.

2.3 Barriers to adoption of e-commerce

Even though people always talk on e-commerce, the numbers of Internet users using an e-commerce are still not encouraging. New surveys show few Asian Web surfers just browse at e-commerce pages and only a small number is buying on-line. There are a few reasons why people don't interest in Business-to-Consumer or B2C transactions. The following factors shall be discussed with particular reference to Malaysia and where relevant other jurisdiction as well [2]:

- *Bandwidth - connection to the internet*

Currently in Malaysia, the speed of internet connection is still slow (about 100 kb/s without Streamyx) when we compared to other advance country where they can offer about 2 Mb/s for free to their citizens.

- *Lack of knowledge and understanding of e-commerce*

The online population in Malaysia can be considered as newborn. As a result, the Internet knowledge level among them is low if compared to developed countries. In order to achieve an informed and computer literate society, IT and Internet access has to be available to everybody. The IT knowledge and ownership of computers is very much focused in the cities. Out of total 2.5 million PCs owned in Malaysia, 65% of them are located in three of the thirteen state; Selangor, Wilayah Persekutuan and Pulau Pinang.

- *Security for conducting business*

This is the major concern of online shoppers when doing their transaction. It is not only worries shoppers in Malaysia, but also of users worldwide. Regardless of the reason, it will create anxiety for many business and consumers. Both online buyers and non-buyers said that they would shop more online if they could be assured that a company on the Web was reputable and if they were confident with the payment system security.

- *Unconvinced of potential benefits*

Many of the company or business are reluctant to join this new technology is because they always enjoy with the profit that they make in a conventional way. They fully trust on their traditional ways of trading so that they will reject any idea or technology introduced to change their old business operation

- *Knowing where to start*

Some of the company who agree to enjoy didn't have enough information on e-commerce business process. E-commerce is not just simply doing a website and promotes a service or product; there are a lot of elements such as market area, product or service availability, resources and security need to be considered when doing business online.

- *Seen as greater threat than opportunity*

Most of the new company seen this e-commerce technology as a threat to them but for the established company, it is a new opportunities to gain market share. The first threat by the company is a successful product or service by their competitors where this technology allows their competitors to distance their gap between them. The second threat by the company is a lot of issues or cases regarding e-commerce such as hackers and virus attacked that can ruined our business.

- *Cost to enable systems*

Even though the cost of doing business online is less than a traditional way in term of building, workers and etc., we still need to consider a cost to enable our online system such as cost of website development, server farm, website maintenance and product or service promotion where it also require a high modal.

- *Concern over vendor abuse*

One of the key concerns for online customers is the reliability of business on the web. The numbers of users that are concern about dealing with dishonest or disreputable vendors while shopping online are increasing. Therefore, it has become the responsibility of the e-business websites to gain users' trust.

- *Too many choices*

In Malaysia, there is a lot of company who offering this service to the customer. It will give the customers opportunities to choose which company offering good and attractive services. This will force the new or existing company to increase the level of customer satisfaction to make sure their company can compete with their competitors.

- *Lack of management willingness to adopt IT*

There are only a few websites that offer delivery service to Malaysia. Malaysian is tending to be followers. Not many are brave enough and afraid of failure to be the pioneers or first movers in creating intellectual property. This is the critical challenge for the society in moving towards knowledge economy (K-Economy).

- *Others*

E-commerce eliminates the opportunity of customers to allow looking, touching and experience the product.

The price of personal computer in Malaysia is relatively high and be some of the barriers of adoption of e-commerce.

2.4 E-commerce Strategy of Adoption

Electronic commerce offers big opportunities for small, medium and large companies throughout the world, so do Malaysia. Many Malaysia companies have use e-commerce technologies to sell products and services to expand their business or make their business more efficient. Even though we can see a lot of companies have successfully on doing their business online, it rarely happens easily and never without some degree of planning. This is what we call business strategy. We must to define our strategy first to determine our intentions for exist in the marketplace. Here are several common strategies that can be applied to various size of e-commerce whether small or wide [4].

- *Awareness building, training and education*

Government need to launch a lot of awareness programmes such as introducing mandatory computer education at all primary schools to promote the use of the internet at early level. Government also can raise awareness in the business community of the usefulness of ICT, for example promoting ICT campaign aimed to encourage them to “go digital”.

- *Access and infrastructure*

Malaysia government has included high speed Internet connection as part of the infrastructure development policies to increase the usage of internet in Malaysia. For example, Telekom Malaysia using their Streamyx service has offers ISDN access about 64 KBPS to 2 MBPS internet connection bandwidth at affordable cost to the customer.

- *Sector-specific policies to promote e-business*

Many countries change their trade policies, developing IT industry and offering investment incentives to IT-related businesses to encourage to the adoption of e-commerce. Common changes in trade policies include the lowering the import tariffs on computers and other hardware and software. This will results in lower price and it proved to be helpful for increasing the use of computer and ICT in general.

- *Legal and regulatory issues*

Many developing countries have enacted legislation to the field of data protection and information privacy and begun to implement that concept by regulating the collection, use, disseminating, and protection of personal data over the Internet. Malaysian government need to concern on the security of the personal information and provide an adequate level of protection for transfer of personal data by enacting similar legislation to make sure user give their trust to e-commerce service.

- *E-government*

Governments can make an important contribution to the promotion of e-commerce by playing a leadership role in the adoption of e-business practices. Putting the government online was an important element of e-commerce strategies to increase confident for doing business online by becoming “model users” of the Internet.

2.5 What's new about E-commerce in Malaysia?

Total Internet users in Malaysia stands at 8.6 million, representing almost 35 percent of Malaysia's total population, according to IDC's recent study which has been released to public in April 2004 [5].

"The increment of Malaysia Internet population remains to be underway, with a growth of 60.5 percent annually from 2002 to 2003," said Huei Min, Lee, Research Manager, IDC Malaysia, commenting on the study on "Analysis and Developments of the Internet Market in Malaysia".

A concerted effort by the government, regulatory bodies, foreign and local multi-national companies as well as the evolution of creative ideas by local dot.com companies that has clearly survived to reap returns and opportunities in the current Internet economy has certainly taken Malaysia's Internet market to a higher pasture," she said in a statement released by IDC Malaysia.

"With the further reduction in broadband pricing and the recently launched PC Gemilang campaigns that ties up dial up access from TMNet are some of the key driving factors for a continuous growth prospect in the Internet market, where IDC forecasts would grow at a compounded annual growth rate of 19.9 percent from 2002 - 2007," she added.

As a percentage of Internet users in Malaysia, Internet buyers also have showed better growth improvements from 24 percent of the Internet population in 2002 to 28.41 percent in 2003, said IDC the premier global market intelligence and advisory firm in information technology and telecommunications industries.

2.6 Virtual Reality for E-commerce in Automobile Industry

The decision making process in car buying is complex, involving the consideration of constraints such as budget, insurance, size, usage, lifestyle and etc. In addition, because of the significant expense and long product lifecycle of car, consumers have to make difficult trading decisions about important factors such as price, style, quality and functionality. Furthermore, after the choice is made, consumers often feel unsure about whether they made the right choice because they can't try the car before they make a payment. The Internet has become a powerful tool for information gathering and communication affecting a fast growing population of online shoppers and markets. The Internet can play an important role by providing satisfactory information about the products or give an opportunity to the customers give a suggestion to our product. This can contribute to better product development, marketing and product distribution for the industry and also help the customers do a better decision making.

Consumers traditionally search for product information in advertising and experience or try products in a physical store. The strongest appeal of e-commerce to consumers is convenience and effectiveness of information searching. Online shoppers who find enough product information to support their purchase decision making are more likely to buy the product. Instead of direct selling to the consumers, company website should work to provide information to consumers. More importantly, integration of operations between e-commerce and building stores should be allowed to provide convenience and reduce costs.

The use of web-based VR technology can be an effective way to get consumers feedback on items in the market. Web-based VR can offer consumers realistic product trials without temporal and physical constraints of traditional way of trading [6]. VR technology offer dynamic interaction with objects by allowing users to zoom in, zoom out, move, rotate, change object attributes, etc. VR systems have attracted significant attention because they can create realistic experience where it can allow the customer to preview the car before they made a decision. The greatest value of VR in e-commerce is it allows people to visually assess product performance and reduces perceived risk prior to purchase.

Streaming video, improved and more frequent use of audio, 360-degree virtual reality tours and 3D modeling are likely to find their way into mainstream e-commerce experiences with the high speed of Internet connection [7]. VR brings product information to online shoppers and salespeople at company showroom quickly and easily. Online customization is found to be a major component of success in financial performance and productivity. In the PC industry, the best-known mass customization success is Dell computer, Inc. by taking advantage of the power of customization of products and services through the Internet [6]. In the motorvehicle industry, a few companies www.toyota.com and www.honda.com are letting customers to specify features they want while reducing the delivery times for custom products. Customization gives consumers the ability to see how their products will appear while managing their budget.

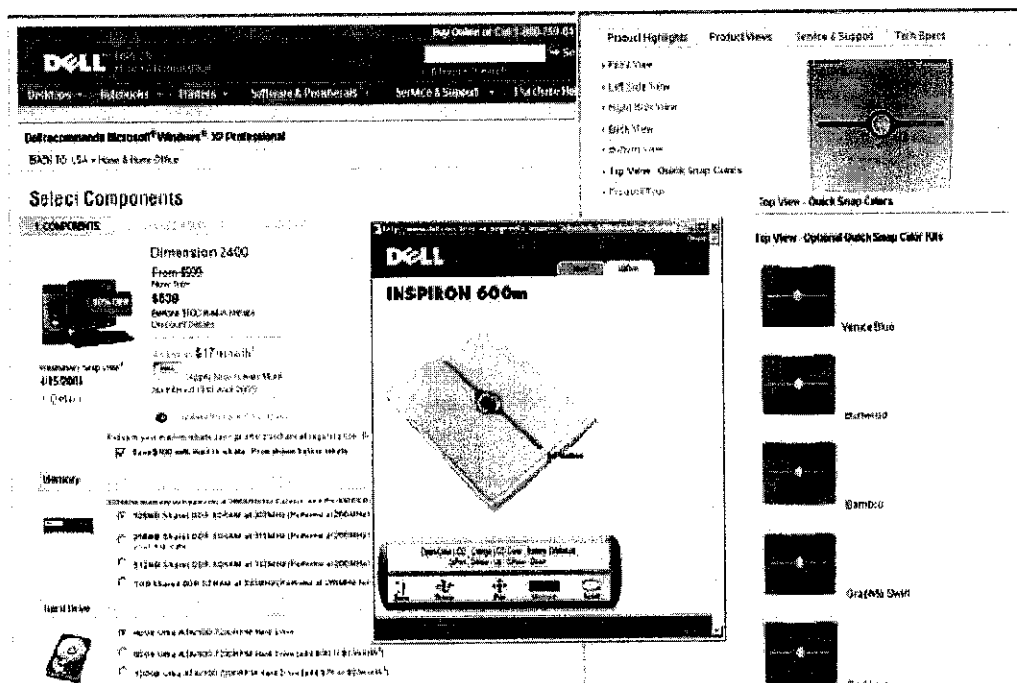


Figure 2.1: Dell's Mass Customization System

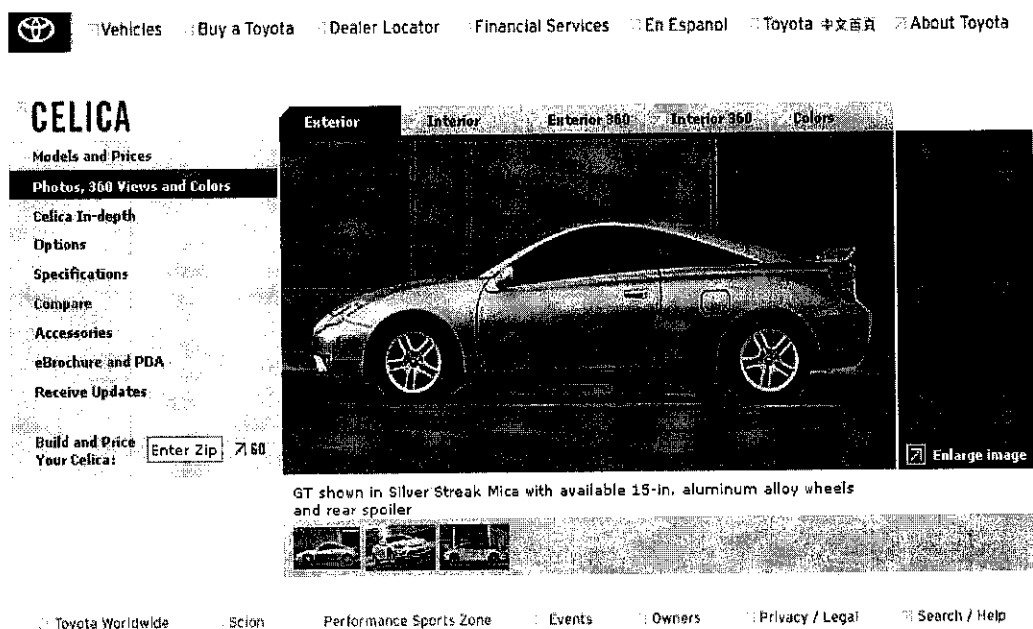


Figure 2.2: Toyota Product Demo in 360⁰.

CHAPTER 3

METHODOLOGY

Methodology is the methods and principles used for developing a project. . It describes how something will be done. A set of analytical methods, procedures and techniques used to collect and analyze information appropriate for evaluation of the particular programme, project or activity. The system development lifecycles are 'process model'; they outline recognized steps for successfully completing complex tasks. It is a guideline that helps system developer to deliver the project on time with user satisfaction. The system methodology refers to the framework that is used to structure, plan, and control the process of developing a system.

There are many system development methodologies that are being used in developing a system. In this project, the author will combine two system development methodologies that are System Development Life Cycle and Rapid Application Development to manage this project development. The reason why the author uses System Development Life Cycle is because it provides a basic concept of system development methodology where Rapid Application Development can assist the developer to deliver a final project to the user in a short time. Most the phases that involve in the project development is taken from System Development Life Cycle, Rapid Application method will be used in design phases to make sure some features could be developed in parallel and some changes can be done.

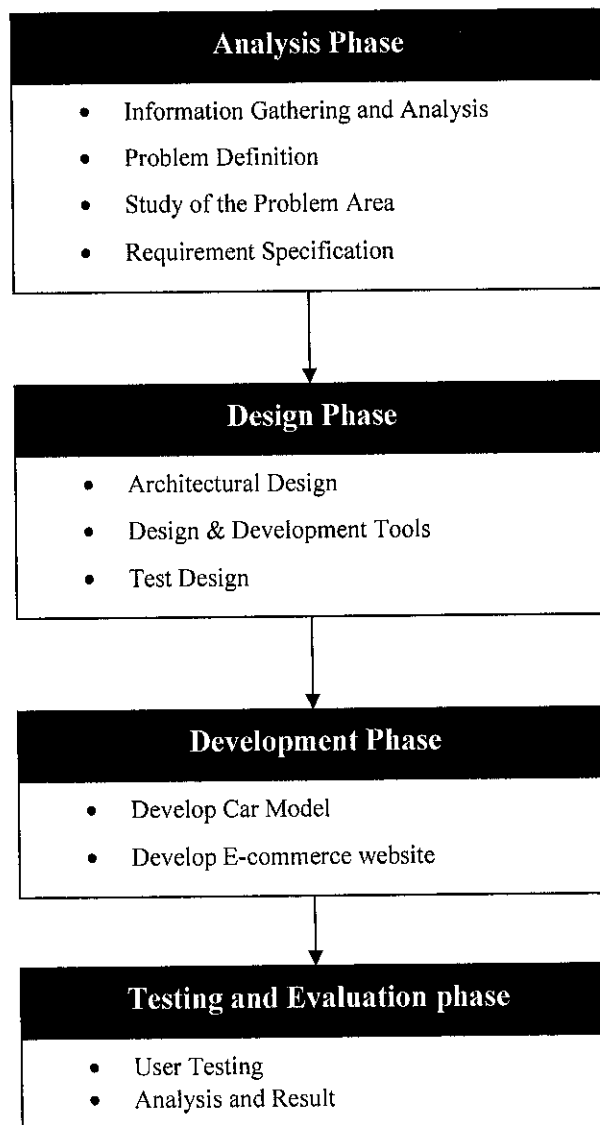


Figure 3.1: System Development Methodology

3.1 Analysis Phase

This phase deals with identifying and analyzing the problems and requirement of the project. During this phase, several methods are use to perform the above tasks.

3.1.1 Information Gathering and analysis

To get the information on the e-commerce and automobile scenario in Malaysia, the author did a research over the Internet. As we all know, Internet is the main source of information for anybody who want to do a research. Although there are not many research on the Internet discussing on e-commerce and automobile industry in Malaysia, but the information available is crucial in identifying and analyzing the current problems regarding the project title.

3.1.2 Problem definition

From the information gathered in the above task, we define what are the major problems regarding the project. The problems are identified from the findings of the research done over the internet and some interview with car dealer.

3.1.3 Study of the problem area

After the problems are defined, a study is done on the problems to find the most suitable solution. This is done by analyzing the causes of the problems; identify ways to solve the problem and how to implement it.

3.1.4 Requirement specification

The purpose of the requirement's specification is to provide a general view for the technical solution to the problem area. It consists of a complete set of requirements, which will then be used to develop a technical solution. During this task, the functional test strategy will be developed to ensure that the system requirements are met. Some of the requirements also are tested to make sure it is possible for them to be put in the e-commerce application.

3.2 Design Phase

Design phase goal is to translate project requirement into visual and functional reality. The design of the project is divided into two parts. First part is designing the conceptual and architectural design and what are tools used in design. Second part deals with testing the design and doing a hypothesis on the design

3.2.1 Architectural design

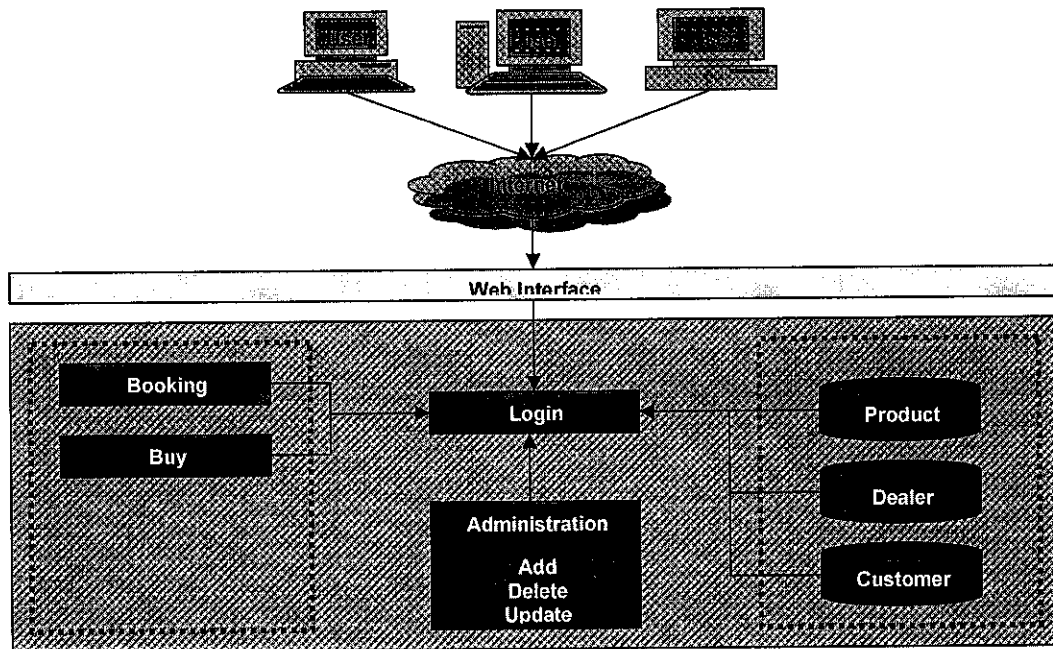


Figure 3.2: Architectural Design

The architectural design consists of the web interface, system login, administration and the database. The web interface shall provide users information about the product and also provide mechanisms to buy or book for test drive. Users can search for the available car model according to these categories, buy and book. There shall be an administrator who is responsible for the maintenance of the website. Any changes to the website will be updated quickly to provide latest information to the users. Three databases will be used containing information on the customers, product available and dealers on the product.

3.2.2 Design & Development tools

The design tools are the tools use to create the design of the project. This includes the software and hardware needed for the above task.

Below is the list of software used to develop the interface of the project:

Software	Functions
Macromedia Dreamwaever MX 2004	Create dynamic web pages
Macromedia Fireworks MX 2004	Design a user interface
Xampp	Webserver and Mysql database
3ds Studio Max	Design 3d object for car model
Internet Explorer 5.5 and higher	To display the user interface

Table 3.1: software requirements

The list of minimum hardware requirements are as follows:

- Intel Pentium III 500Mhz
- 64 MB of memory (128 is recommended)
- 150 MB of available disk space

3.2.3 Test design

The methods by which the test will be conducted are determined at this stage. A design hypothesis will be conducted. Methods and tools to be used in the test are by using user hands-on test and interview session to get users’ feedback for evaluation purposes. The participants will be picked randomly and one car company representative will be chosen to try this system. After the test has been performed, the results will be analyzed.

3.3 Development phase

This phase will enter us into the production mode, whereby the application’s architecture and interface are being developed.

3.3.1 Develop E-commerce website

The project consist several parts such as company website, system database, system interface and Virtual Reality model. Each part will be done in parallel to make sure this project require less time to complete. This will allow the developer to focus on each part of the system thoroughly. The part is divided according to the different functions that the system has such as buying car accessories or book a car model.

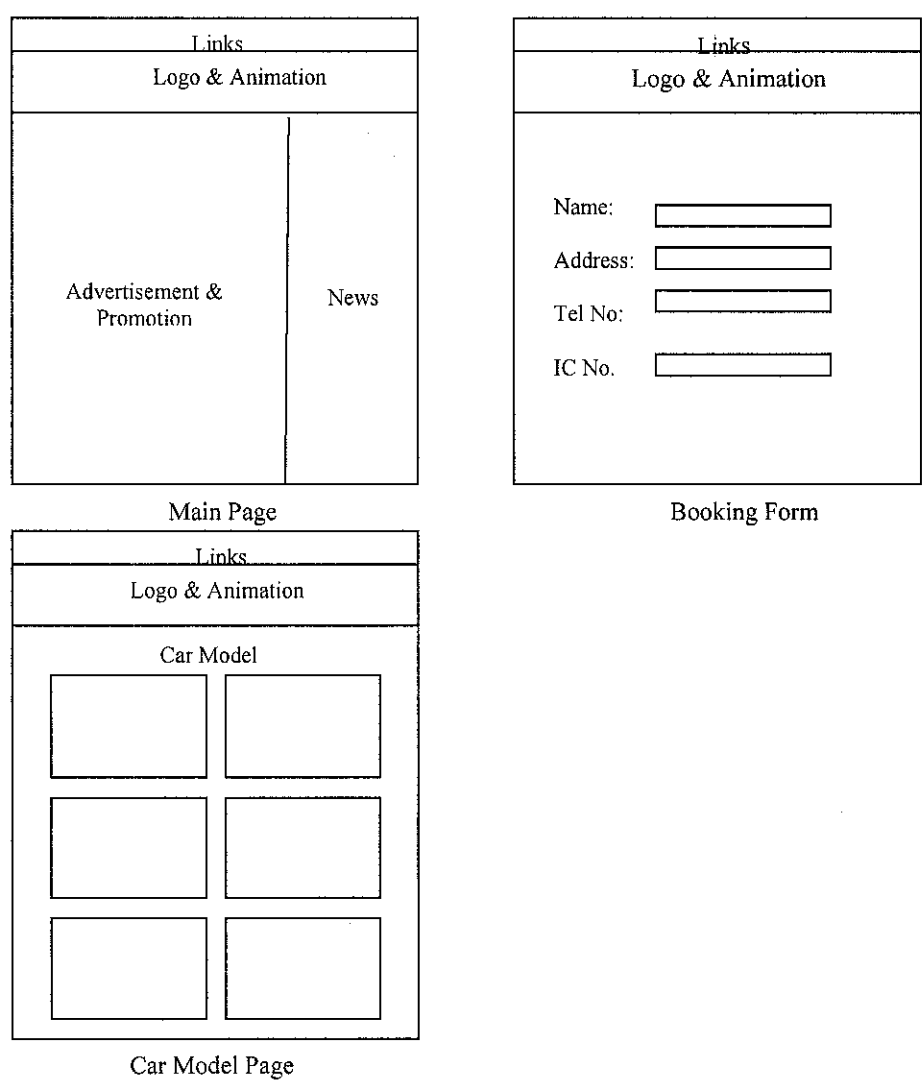


Figure 3.3: Website Layout design

3.3.2 Develop Car model

The car model is developed using 3d modeling software before it being exported to VRML coding. The VRML coding need to be integrates with website that allows the 3d object to be run in our system. We must make sure that our website is VRML plug-in enable to make sure it can run our 3D object model.

3.4 Testing and Evaluation phase

This will be the final phase whereby the system will be tested and run in a real life. User usability testing also will be conducted to get users' feedback on our system.

3.4.1 Analysis and result

In order to ensure that the project is complying with the users' requirements, a system testing is conducted by giving the user the opportunity to experience the system themselves. A group of users are chosen and the feedback will be used to determine the acceptance of the users.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 System Layout Design

The layout result showed the important part of the website, which as follows:

- Main Page
- Online Catalog
- Booking form

In this part, the author will give an explanation on how the website works and interact with users.

- Main page

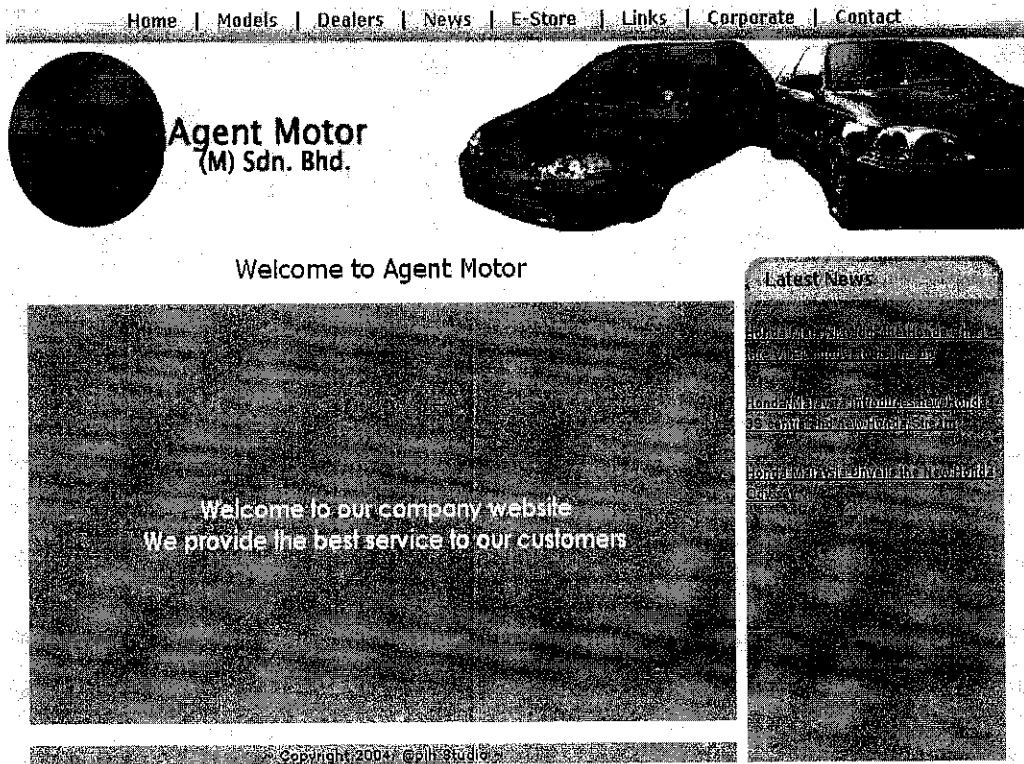


Figure 4.1: Main Page

This is the main page that the user will see when they first browse this website. This website same as other company website where it provide information to the internet user. This page also is divided into several parts such as main menu, news, advertisement and company animation. Main menu is a set of buttons for the customers to browse the website. News part show the latest news for the company and the advertisement part show the current advertisement offered by the company.

Agent Motor (M) Sdn. Bhd.

News

- >> [**Honda Malaysia adds the Honda City 1.5-litre VTEC model to its line-up**](#)
- >> [**Honda Malaysia introduces new Honda 3S centre and new Honda Stream**](#)
- >> [**Honda Malaysia Unveils the New Honda Odyssey**](#)

[Main Menu](#)

[Honda Malaysia adds the Honda City 1.5-litre VTEC model to its line-up](#)

Petaling Jaya, 28 July 2004 - Honda Malaysia Sdn. Bhd. (HMSB) has announced the introduction of a new City powered by a VTEC engine which generates intensive, highly-efficient combustion resulting in high power output, high fuel economy and ultra-low emissions. Honda Malaysia Sdn. Bhd. (HMSB) has announced the introduction of a new City powered by a VTEC engine which generates intensive, highly-efficient combustion resulting in high power output, high fuel economy and ultra-low emissions.

The new Honda City VTEC has a 1.5-litre 16-valve 4-cylinder VTEC (Variable Valve Timing and Lift Electronic Control System) power plant that yields up to 110 PS at 5,800 rpm and 14.6 kg-m at 4,800 rpm. Given its Variable Valve Timing and Lift Electronic Control System that works in synch with various driving conditions, the VTEC engine achieves a clean combustion, maximum horse power and torque output while saving fuel at the same time.

Aside from the VTEC variant, the new Honda City also comes with a 1.5-litre i-DSI (Intelligent Dual and Sequential Ignition) engine. The City i-DSI variant was first introduced to the Malaysian market in April 2003 and went on to become HMSB's best-selling model of that year.

The Honda City comes with an advanced CVT (Continuously Variable Transmission) automatic transmission that continually monitors throttle opening and duration, and automatically changes driving mode for optimum control. The transmission delivers a completely natural driving feel. Honda has also optimized the belt speed ratio range and equipped the transmission with direct control of pulley side pressure, thereby enhancing transmission efficiency and aiding fuel economy.

When driving the Honda City, one can experience the best features of both manual and automatic systems in a single transmission with the Steermatic and a 7-speed mode. This advanced system can be selected by pressing a master control beneath the right steering wheel spoke. The City is also equipped with a highly advanced

Figure 4.2: News Page

- Online Catalog

From the main page, user can go into the online catalog page to look for the car available to be sold. To go to the pages, users can click on model button if users wish to browse for car available in that company. The user will be linked to the respective website based on the button that they clicked.

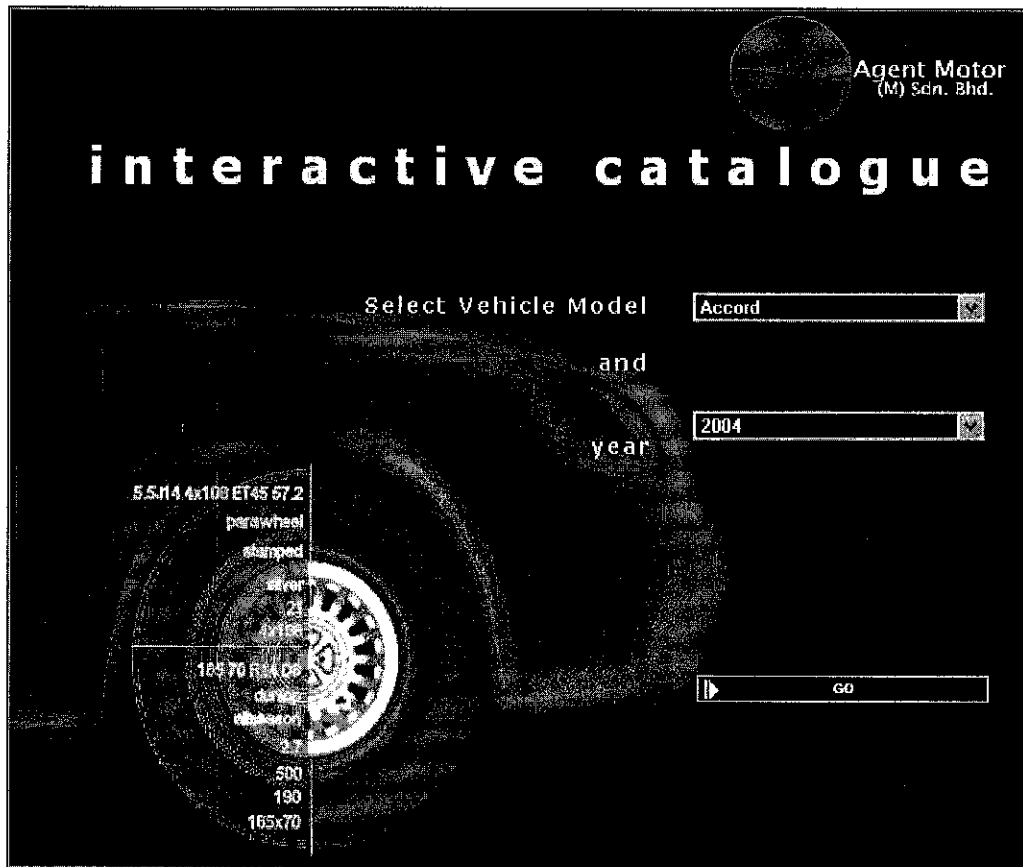


Figure 4.3: Online Catalog Page

This is the interface for the online catalog. Users need to choose the car model available and the year of the car model from the list box. After that users need to click “Go” button to go to the next page to see the result of their selection.

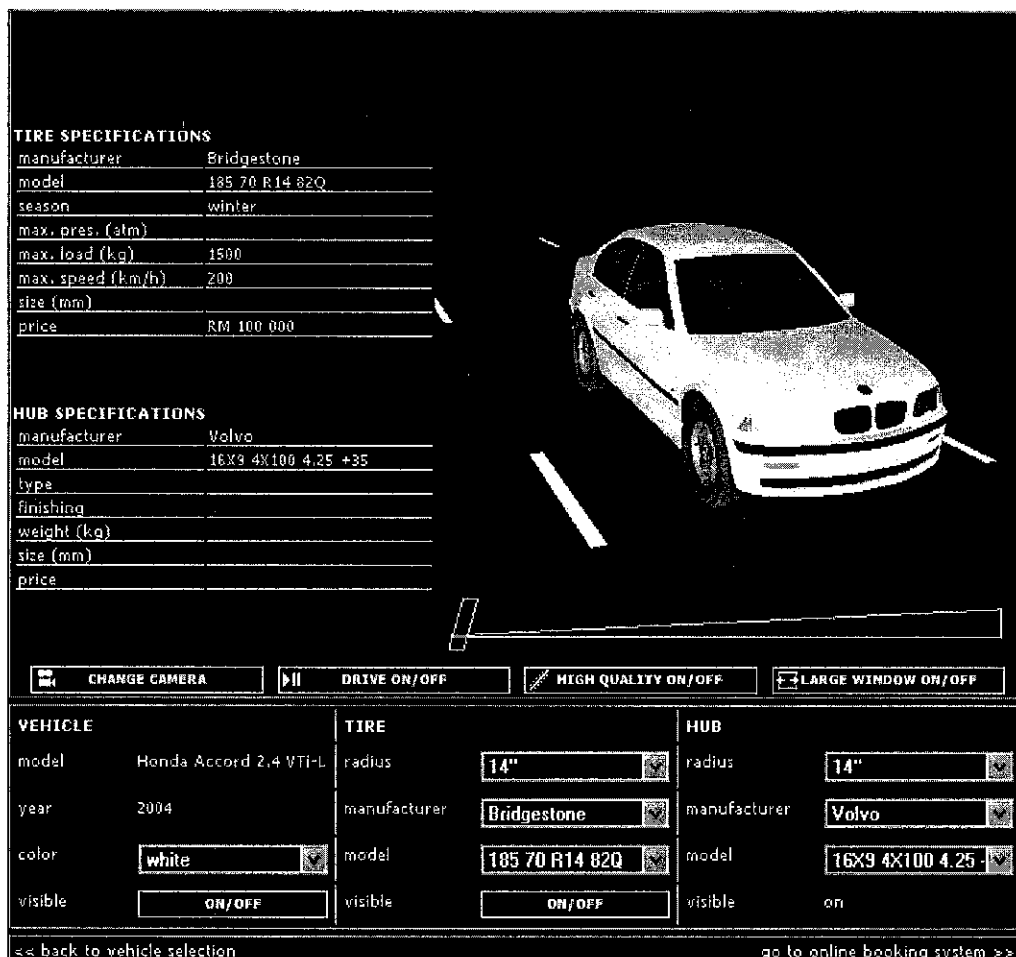


Figure 4.4: Online Catalog Page 2

This is the interface for the selection user has made before. As shown in the figure above, the result displayed the car specification in more detail such as type of tire, vehicle description, hub and etc on the left top of the page. On the right top of the page shows the car model in VR where user can navigate the car in 360°. On the middle of the page shows the 4 button for the user to manipulate the VR car model. On the bottom of the page shows the customization part where user can choose color that they desired, type of tires and etc. There also have “back to vehicle selection” button that allows user to back to car selection page and “go to online car booking” button to direct the user to online booking page.

- Booking Form

Agent Motor
(M) Sdn. Bhd.

Car Booking

- >> Car Model
- >> Customer Details
- >> Select a Dealer
- >> Booking Payment
- >> Summary

Car Model

Car Model: Accord
Year: 2002
Specification: Automatic
Color: Blue

Customer Details

Given Name: *
NRIC / Passport: *
Surname: *
Gender: Male
Address: *
City/Town: *

Figure 4.5: Car Booking Form

When user clicks the “go to online car booking” button, user will be directed to the page as shown above. User will be required to fill in their details if they wish to book the car from that company through online. There are several steps for user to book the car online such as car model, personal information, contact information, dealer selection and booking payment. After finish filling in the form, user needs to click on the “Submit” button to review their application.

Agent Motor
(M) Sdn. Bhd.

Car Booking

>> Car Model

>> Customer Details

>> Select a Dealer

>> Booking Payment

>> Summary

Car Model

Year

Specification

Color

Given Name

NRIC / Passport

Surname

Gender

Address

City / Town

Postcode

State / Region

Tel (Home)

Tel (Office)

Tel (Mobile)

Tel (Fax)

: Accord

: 2002

: Automatic

: Blue

: Abdul hakeem Kusnami

: 821108-02-6113

: Apik

: Male

:

:

:

:

:

:

:

:

Figure 4.6: Car Booking Form 2

The next page shows the detail information that has been entered by users in the previous page. Users can check the correctness of the details. If there are any corrections need to be made, user can go back to the previous page by clicking on the browser's back button.

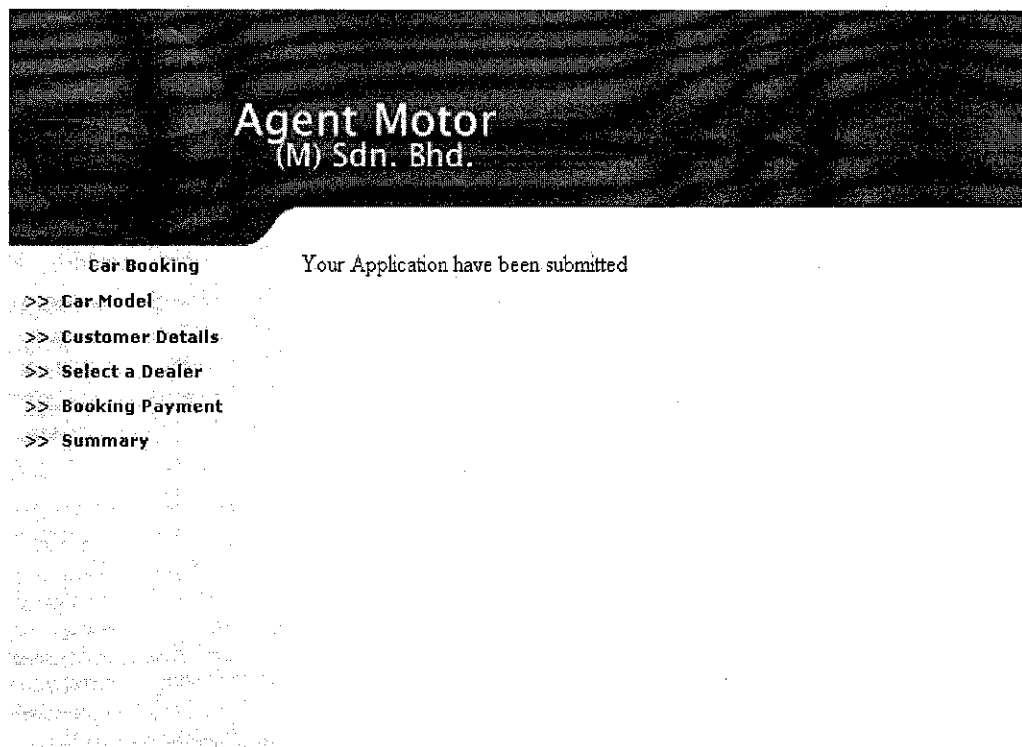


Figure 4.5: Car Booking Form 3

When user have confirmed the details by clicking the submit button in the previous page, they then will be directed to a new page that will tell the users that the company will contact the users when they have finished processing the form.

4.2 Post- Test Evaluation

A post test evaluation has been done to get the user’s feedback on the interface. A sample of the evaluation form is available in Appendix 4-2

The data that have been collected are then converted to statistical data and chart for easier interpretation and evaluation. This is the result for the post- test evaluation.

Attributes	N	Min	Max	Sum	Mean
Interface Comment	10	6	8	73	7.3
Linking Problem	10	9	10	94	9.4
Loading Time	10	6	8	80	8
Features	10	5	7	63	6.3
Valid N	10				
Overall Mean	7.75				
Range	3.1				

Table 4.1: Post Test Result

Hypothesis of the project:

The evaluation: improvement on the features of the website

H_0 : There are no improvements by providing additional features.

H_A : Improvements by adding additional features

From the table 4.1, the minimum mean for the post- test evaluation is 6.3 while the maximum mean is 9.4. The range, R for the result is 3.1 and the overall mean, M is 7.75. The hypothesis can be accepted only if $R > M$. From the result, $M > R$. thus, the hypothesis cannot be accepted.

From the result, the hypothesis (H_A : Improvements by adding additional features) can be said as false. 7 out of 10 evaluators said that the website needs additional features so that it can help provide better services to its users. 4 of the evaluators said that the website should enhance and integrated each other to make it more interactive. 80% of the evaluators feel that they would like to try this kind of service.

An interview session has been conducted to ask for the evaluators on how the website offers better service. 7 out of 10 evaluators said that the website should have a link with local bank in order to have information on the available loans or doing transaction online. The interaction with the VR car model should be enhanced as this will allow user to experience the car as it is by make all car features interactive to the user.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Summary

The project is about developing an e-commerce website that takes advantages of web capability whereby user has the opportunity to navigate a car model in 3D. With the website, users can have a lot of updated information or offers from the automobile company regarding a new car model or any promotion offered by the company. Those who interested to buy or book any car model can do so through this e-commerce website where it manages all the process of buying a new car.

The project objective is to design a website for automobile industry, to promote and provide information to customers where it can be accessed at anytime and anywhere using web browser. E-commerce has high potential to growth especially in Malaysia because of people are now increasingly understand the current technological advancement that could help them to manage their life everyday. Through online, business can gain competitive advantages by moving their business operation through online. The reason why e-commerce boosts in Malaysia industry is because several factors such as it provide a new way of communication, new means of distributing information; information is easily accessible around the world and others

E-commerce can affect our Malaysian society because it can shift or introduce the new way Malaysia's shop and promoting Internet shopping as way of life. With that we could compete with other developed country which makes a full use of e-commerce as their way of trading. But with the current Malaysian people, most of them are still reluctant to do online shopping. Several factors contributed to these problems such as low bandwidth connection, lack of knowledge and understanding of e-commerce, security or conducting business, high cost, concern of vendor abuse, low level of computer literacy and others.

5.2 Recommendations

In order to make the website more interactive and provide better opportunities for the automobile industry, several features can be implemented to make sure customers are satisfied on what we offer in the website. Among the features that could be done is providing attractive main page for the website, provide clear and enough information of the car, secured information transaction and online forum.

- Attractive main page

Main page is a landing page of the website. It is a first page that customer will see when they open our website. Main page needs to be attractive enough and require less time to upload so that customer will have a good impression to our product and believe on what we offer in the website. All the buttons and links need to be at the right place to help the user easily navigate through our website. All the information in the first page needs to be updated frequently to make sure we provide latest information to our customer regarding our product.

- Clear and enough information

We need to do a research on what is the information that customer really need when making a survey on an Internet. We need to do some questionnaire or interview with the real automobile agent to make sure we get right information to be provided to our customer. Examples of information needed by the customer are price, loan available, security features or any other accessories provided by the car model.

- Secured information transaction

One of the main concerns for developing an e-commerce is their security of the data or credit card number. Company need to provide and proved that their company are using a good security features so that all the customer details will be keep or stored safely. This will solve the problem of data privacy or fraud and hence will increase the level of trustworthiness by the customer to our company.

- Online forum

An online forum will enable the company car agents and users communicate effectively in real time basis. To enable this, a messenger system can be developed. Users can do discussion on automobile issues and the car agents can provide a better service to customers by responding to their queries. This can provide interactions between the users and the car agents to make sure customer relationship with the company can be developed.

5.3 Future Research Enhancement

Even though this website has reached its final stage, there is a hole for future enhancement to make sure this website can fully meet customer satisfaction. To further enhance this product, this website can be enhanced with 2 main features that are:

- 3D Car model

To enhance the quality of the car model, it can be developed using various type of 3D application to show the actual car model in the computer using the actual measurement to make sure user will have actual idea how the car looks like. Make sure the car model can be navigated 360⁰ in interior and exterior view. User access to the car features such as radio cassette or some button in the car also can increase the level of satisfaction by the user.

- Online Banking

As the title of this project is about e-commerce, it is necessary for the website to have a complete e-commerce system. E-commerce actually is a big thing because we need to consider the security features that the website offers before open it for online uses. With the concentration on the security itself, the website can have an online banking application to help the users dealing with their finance stuff.

5.4 Conclusion

In order to make all these succeed, we must develop some understanding of what drives technological innovation in the first place. Technological is at its peak when consumers tastes for an improved quality of life outrun the existing capability of the economic system to provide it in an affordable way. Malaysia has a huge potential for the Internet procurement. For Malaysians, it will be hard for them to adapt to online shopping due to security issue and cultural inertia. The important thing in e-commerce is to provide a secured transaction online. The attitude of Malaysia community need to be changed and this will be a critical challenge to all. The government is heavily promoting the importance of IT by making great strides in education and training. Various ways have been done by the government through one of its ministry, Ministry of Energy, Water and Communication, to bring closer the gap between the information rich or poor. The latest gesture made is developing a rural internet centre. Rural Internet Centre (RIC) was formed to make sure that the rural area will also get some exposure to the Internet. The introduction of lower price PC hopefully will enable more people to have a PC at their home.

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APPENDICES

Appendix 4-1

Post test Evaluation Form

Evaluation Form										
Observer Name	Abdul Hafeez bin Kusmani						Date	2 November 2004		
System Name										
Instructions:	Please rate the interface by circling the number on rate 1 to 10, please rate the following area 1 = worst, 10 = good									
Tester Name										
Interface Comment	1	2	3	4	5	6	7	8	9	10
Linking Problem	1	2	3	4	5	6	7	8	9	10
Loading Time	1	2	3	4	5	6	7	8	9	10
Features	1	2	3	4	5	6	7	8	9	10

Please give your suggestions to improve the website:

THANK YOU!

Appendix 4-2

Post Test Evaluation Raw Data

1. Interface Comment

	Data
Evaluator 1	7
Evaluator 2	8
Evaluator 3	7
Evaluator 4	6
Evaluator 5	7
Evaluator 6	8
Evaluator 7	7
Evaluator 8	8
Evaluator 9	8
Evaluator 10	7
Sum	7.3
Mean	7.3

3. Loading Time

	Data
Evaluator 1	7
Evaluator 2	8
Evaluator 3	7
Evaluator 4	7
Evaluator 5	8
Evaluator 6	6
Evaluator 7	7
Evaluator 8	8
Evaluator 9	7
Evaluator 10	8
Sum	80
Mean	8

2. Linking Problem

	Data
Evaluator 1	9
Evaluator 2	9
Evaluator 3	9
Evaluator 4	10
Evaluator 5	10
Evaluator 6	9
Evaluator 7	10
Evaluator 8	9
Evaluator 9	10
Evaluator 10	9
Sum	94
Mean	9.4

4. Features

	Data
Evaluator 1	7
Evaluator 2	6
Evaluator 3	5
Evaluator 4	6
Evaluator 5	6
Evaluator 6	7
Evaluator 7	7
Evaluator 8	6
Evaluator 9	6
Evaluator 10	7
Sum	63
Mean	6.3